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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DOUGHERTY, THOMAS M	

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/811,311	HAGOOD ET AL.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-10,15,18-22,24-26 and 29* is/are rejected.

7)☒ Claim(s) *6,11-14,16,17,23,27,28,30 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *905*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 5, 9, 10, 18, 21, 22, 25, 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Radziemski et al. Radziemski et al. show (fig. 3) an apparatus for harvesting energy from a transducer (205) comprising: an input storage element (216), connected to receive an energy signal originated by the transducer (205) and to store electrical energy received therefrom; a controlled conversion element (218), connected to the input storage element (216) and to provide a converted signal therefrom, and to constrain an input storage element voltage value to vary only within a controlled operating voltage range that varies from a low operating voltage value to a high operating voltage value, the high operating voltage value being less than a peak open-circuit voltage value that corresponds to an input storage element (216) voltage value to which the input storage element (216) would rise under excitation if no other circuit elements were attached to it; and an output storage element (220), connected to the controlled conversion element (218), and to store energy received from the converted signal.

They further show a rectifying bridge (214), connected to the transducer (205), for receiving an electrical signal therefrom and for providing the energy signal as a rectified signal.

They further show (fig. 8) a load circuit (470), connected to receive energy from the output storage element (in this case 454). Note in fig. 3 that the output from the output storage (220) is clearly intended to supply a load between nodes 222 and 224.

The apparatus is self-powered from harvested energy. Note in fig. 3 there are no external power sources save the piezo element.

The conversion element (218) is powered from harvested energy.

Radziemski et al. show (fig. 3) a method for harvesting energy from a transducer (205) comprising: storing electrical energy (via 216) received from an energy signal originated by the transducer (205) in an input storage element (216); converting (via 218) the energy stored by the input storage element (216) in a controlled fashion to provide a converted signal therefrom, the conversion constraining an input storage element voltage value to vary only within a controlled operating voltage range that varies from a low operating voltage value to a high operating voltage value (see paragraph 0089), the high operating voltage value being less than a peak open-circuit voltage value that corresponds to an input voltage value to which the input storage element would rise if no other circuit elements were attached to it (note that this last is regarded as a goal of the invention and is not further limiting to the claimed structure); and further storing energy (via 220) in the converted signal in an output storage element (220).

They show rectifying (via 214) an electrical signal produced by the transducer (205), to provide the energy signal as a rectified energy signal.

They show connecting a load circuit to receive energy from the output storage element. See discussion on this feature above.

As noted above, they show self-powering the apparatus from harvested energy.

As noted above, the conversion step is powered from harvested energy.

Claims 1, 2, 4, 5, 7-10, 15, 18, 19, 21, 22, 24-26 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Hamel et al. Hamel et al. show (fig. 11a) an apparatus for harvesting energy from a transducer (20) comprising: an input storage element (78), connected to receive an energy signal originated by the transducer (20) and to store electrical energy received therefrom; a controlled conversion element (84), connected to the input storage element (78) and to provide a converted signal therefrom, and to constrain an input storage element voltage value to vary only within a controlled operating voltage range that varies from a low operating voltage value to a high operating voltage value, the high operating voltage value being less than a peak open-circuit voltage value that corresponds to an input storage element (78) voltage value to which the input storage element (78) would rise under excitation if no other circuit elements were attached to it; and an output storage element (42'), connected to the controlled conversion element (84), and to store energy received from the converted signal.

They further show a switch (82), connected to receive the energy signal originated by the transducer (20) and to provide a switched energy signal therefrom; and a voltage controller (voltage divider 94), connected to control the switch (82).

They further show a rectifying bridge (40), connected to the transducer (20), for receiving an electrical signal therefrom and for providing the energy signal as a rectified signal.

They further show a load circuit (44), connected to receive energy from the output storage element (42'). The apparatus is self-powered from harvested energy. Note in fig. 3 there are no external power sources save the piezo element.

They show a Direct Current to Direct Current (DC-DC) converter (84), connected to receive the switched energy signal, and to provide energy to the output storage element (42').

The DC-DC converter (84) couples electric power from the switched energy signal to a load circuit (44).

The conversion element (84) is powered from harvested energy.

The controlled conversion element (84) ensures that the DC-DC converter controls the energy signal such that the conversion element runs discontinuously in such a manner to approximately optimize power transfer from the input storage element (78) to the output storage element (42').

Hamel et al. show (fig. 11a) a method for harvesting energy from a transducer (20) comprising: storing electrical energy (via 78) received from an energy signal originated by the transducer (20) in an input storage element (78); converting (via 84)

the energy stored by the input storage element (78) in a controlled fashion to provide a converted signal therefrom, the conversion constraining an input storage element voltage value to vary only within a controlled operating voltage range that varies from a low operating voltage value to a high operating voltage value (note as Hamel et al. show the noted structural features, the operability is inherent), the high operating voltage value being less than a peak open-circuit voltage value that corresponds to an input voltage value to which the input storage element (78) would rise if no other circuit elements were attached to it (note that this last is regarded as a goal of the invention and is not further limiting to the claimed structure); and further storing energy (via 78) in the converted signal in an output storage element (78).

They provide a switched energy signal from a voltage switch (82) connected to receive the energy signal originated by the transducer (20); and controlling (via voltage divider 94) the voltage sensing switch (82).

They show rectifying (via 40) an electrical signal produced by the transducer (20), to provide the energy signal as a rectified energy signal.

They show connecting a load circuit to receive energy from the output storage element. See discussion on this feature above.

The voltage sensing switch additionally comprises: performing a Direct Current to Direct Current (DC-DC) conversion (via 84) on the switched energy signal to provide energy to the output storage element (42').

As noted above, they show self-powering the apparatus from harvested energy.

As noted above, the conversion step is powered from harvested energy.

As noted, they control the energy signal such that the controlled conversion element (84) runs discontinuously in such a manner to approximately optimize power transfer from the input storage element (78) to the output storage element (42').

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Radziemski et al. (US 2003/0137221) or Hamel et al. (US 2004/0078662). Given either's invention, neither note a center point of the controlled operating voltage range as being about one-half of the peak open-circuit voltage value. This is however regarded as a goal of the invention. As both references show the claimed structural features, this is regarded as being met by them.

Allowable Subject Matter

Claims 6, 11-14, 16, 17, 23, 27, 28, 30 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to show or fairly suggest the means to determine a maximum

average power throughput from the transducer to the load circuit or an external controller for the controlled conversion element or a programmable controlled operating voltage range or a voltage range set by bias points in an electronic circuit; or a controlled conversion element comprising a pair of Zener diodes, arranged to determine the high and low operating voltages and a pair or transistors arranged to activate the voltage sensing circuit.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd

tmd

November 23, 2005

Thomas M. Dougherty

TOM DOUGHERTY
PRIMARY EXAMINER